



Post-Conference Activities

Making Radio Waves

Teacher Sheet(s)

Objective: Students will make and test a simple radio-wave generator using ordinary household materials.

Level: K-4

Subjects(s): Science as Inquiry, Physical Science, Technology

Prep Time: 10-30 minutes

Duration: 50 minutes

Materials Category: Special Requirements

National Education Standards

Science: 2a, 3a, 6a

Technology (ITEA): 1b, 11b, 12a

Materials:

(Per group)

One inexpensive transistor radio (must receive AM)

Two 25-centimeter lengths of insulated wire (18-24 AWG)

One metal fork

Tape (masking or electrical)

One "C" or "D" flashlight battery

Metal tray or metal foil

Tape measure or meter sticks

Pre-Lesson Instructions:

1. Begin collecting small radios that can receive AM stations. Students may have radios at home they can bring in.
2. Cut two wire "leads" (lengths) for each group. Cut the leads each 25-centimeters long from a spool of wire.
3. Using a sharp knife or wire stripper scrape about 1 centimeter of plastic coating from each end of the wire.
4. Divide the class into groups of three to four.

Suggested Discussion Starters:

Ask students, "How do you think radios work?"

Ask students, "Why can we hear something when we strike a drum, but we don't see anything happen?"

Notes:

This activity will need to be completed outdoors because each group will need a space several meters long to test how far radio waves from their radio wave generator can travel.

Set out the trays, flashlights, and tape measures in a central location.

Background Information:

None

Guidelines:

When the bare wire is stroked against the fork, it generates something called electromagnetic radiation by releasing electric energy from the battery.

Ask students, "What does this activity tell you about the sound you hear on the radio? (Radio and light waves are both types of electromagnetic radiation. The electromagnetic spectrum is made up of different lengths of waves.) Explain to students, that electromagnetic radiation travels through space. Radio waves are long. Light waves are shorter.

Discussion/Wrap-up:

None

Extensions:

Draw the electromagnetic spectrum. (For upper elementary levels)

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Student Sheet(s)

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(Per group)

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Two 25-centimeter lengths of insulated wire (18-24 AWG*)

One metal fork

Tape (masking or electrical)

One "C" or "D" flashlight battery

Metal tray or metal foil

Tape measure or meter sticks

*AWG is the standard gauge used to measure wire. Insulated, 18-24 AWG wire will be thin copper wire coated with plastic, and is available from electronics, hardware, or home supply stores.

Procedure

1. To create a radio-wave generator, securely tape the end of one length of wire to one end of the battery.
2. Tape the end of the second wire to the other end of the battery.
3. Wrap the other end of either one of the wires tightly around the handle of the fork, making sure that the bare copper is touching the handle.
4. Put your radio on the AM band.
5. Turn on the radio.
6. Turn the dial all the way in one direction so that all you hear is static.
7. Holding the fork close to the radio, stroke the bare end of the other wire lead across the fork's prongs.
8. You should hear corresponding static on the radio. If you do not, you should make sure the wires are securely attached to the battery and fork handle. You have just created radio waves (represented by the static).
9. Measure off a distance of 20 centimeters from the radio.
10. Place your radio wave generator at the spot 20 centimeters from the radio. Record observations.

11. Vary the distances between the radio and the radio-wave generator.
Record the distances and observations.

12. Insert obstacles between "source" and "receiver." Record your observations.

Observations

Distance (centimeters)	Observations

Record your observations from placing something between the "source" and the "receiver".

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How did the fork affect the radio?

How did changing the distance affect the radio waves?



Resources

NASA

For information on exploratory missions, manned spaceflight, and more, please visit this website.

www.nasa.gov

NASA Kids Club

For activities, games, stories and more, visit this website specifically designed for kids that are interested in space and NASA.

<http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html>

American Radio Relay League (ARRL)

<http://www.arrl.org>

Radio Amateur Satellite Corporation (AMSAT)

<http://www.amsat.org>